12 December 2014

VIA ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Location Accuracy "Roadmap" Submitted by APCO, NENA, and The Four National Wireless Carriers, PS Docket No. 07-114

Dear Ms. Dortch:

The National Association of State 911 Administrators (NASNA) appreciates the opportunity to submit comments on the wireless location accuracy roadmap submitted by APCO, NENA, AT&T Mobility, Sprint, T-Mobile USA and Verizon. [1]

NASNA represents the State 911 programs across the country in the field of emergency communications. Established in the 1990's as a 501(c)(3) non-profit organization, NASNA is the voice of the States on public policy issues that impact 911 nationwide. NASNA believes that State 911 leaders' expertise can assist industry associations, public policymakers, the private sector, and emergency communications professionals at all levels of government as they address complex issues surrounding the evolution of emergency communications.

The FCC, in a public notice released on 20 November 2014, invited comment on the "Roadmap for Improving E911 Location Accuracy" (Roadmap), filed in the E911 Location Accuracy proceeding (PS Docket No. 07-114) by the Association of Public-Safety Communications Officials (APCO), the National Emergency Number Association (NENA), AT&T Mobility, Sprint, T-Mobile USA, and Verizon (Carriers). The Commission asked whether the Roadmap presented a reasonable alternative to the proposals set forth in the *Third Further Notice*, urged commenters to address the specific elements of the Roadmap, and asked if the Commission should incorporate each such element in whole, in part, or with modifications, into the rules that it ultimately adopts.

The Commission "encourage[d] industry, public safety entities, and other stakeholders to work collaboratively to develop alternative proposals for our consideration."[2] NASNA was a signatory to the 1996 wireless E911 consensus agreement (CC Docket 94-102) along with CTIA, APCO and NENA. In light of that historical fact, we would have expected to have had a seat at the table during the most recent consensus agreement discussions, but we did not know that negotiations were occurring until late in the process and we were not asked for input at that juncture. Nevertheless, the four national carriers along with APCO and NENA did take the initiative to

[1] Individual members may provide separate comments to the Commission that agree with, amplify, differ from, or are in addition to the comments offered by NASNA in this matter.
[2] Wireless E911 Location Accuracy Requirements, *Third Further Notice of Proposed Rulemaking*, PS Docket No. 07-114, Federal Register Vol. 79, 28 March 2014, (*Third Further Notice*) ¶ 6

respond to the Commission's encouragement as set forth in the *Third Further Notice.* Our comments reflect the numbered paragraphs in the Roadmap. If something appears not to be in sequence, it is because we did not comment directly on a particular paragraph or paragraphs.

1) Test Bed

The *Third Further Notice* proposed that CMRS providers would demonstrate compliance with indoor location accuracy requirements through participation in an independently administered test bed program modeled on the indoor test bed administered by the Communications Security, Reliability, and Interoperability Council (CSRIC).[3]

The Roadmap commits the carriers to a test bed that 'will be consistent with the elements recommended by the CSRIC III Working Group' as well as 'with the work undertaken by the Emergency Services Interconnection Forum (ESIF) established by the Alliance for Telecommunications Industry Solutions (ATIS).'[4] The Roadmap's test bed "will be managed by a non-governmental entity"[5] such as ATIS, and operated in "an open, transparent and competitively neutral manner, as to technologies, carriers and location solution vendors."[6] Roadmap commits to standing it up within 12 months of the agreement.[7] The Roadmap meets the expectations set forth in the *Third Further Notice* in these respects. NASNA recommends the Commission codify these elements of the Roadmap in any rules adopted under this proceeding.

The *Third Further Notice* proposed a requirement to test "the following performance attributes: location accuracy, latency (Time to First Fix), and reliability (yield)."[8] The Roadmap commits to testing location accuracy, but does not address time to first fix or yield. The Commission thought these elements of testing were important, and so does NASNA. To the extent these elements were not specifically addressed in the Roadmap, we would ask the Commission to include them in its rules.

The Roadmap test bed will be operated in real-world conditions and validated by live 911 calls, not just calls placed in the test-bed environments. NASNA appreciates that aspect of the Roadmap.

To the extent any of the Commissions other proposals related to the test bed were not specifically addressed in the Roadmap, NASNA asks the Commission to include them in its rules to ensure there is no ambiguity and that the test bed will fully address everything the Commission expects. This should include the Commission's expectations of the carriers' remedies if the test bed should yield unfavorable results.

2) Location Solutions Providing Dispatchable Location

[3] Ibid ¶ 3
[4] See Roadmap at 1.a.iii
[5] Ibid 1.a
[6] Ibid 1.a.i
[7] Ibid 1.a.
[8] Third Further Notice at ¶ 72

a) Dispatchable location. The *Third Further Notice* defines a dispatchable address as the "caller's building address, floor level, and suite/room number."[9] The Roadmap uses the same definition, but calls it "dispatchable location" rather than "dispatchable address." The Commission referred to the dispatchable location/address concept as a "long-term indoor location objective"[10] and asked whether it should consider adopting such a requirement *in addition to its proposed 50-meter accuracy requirement.*

   The Roadmap would escalate the Commission's long-term objective by conducting a demonstration of a dispatchable location solution within nine months[11] of the date of the agreement and by incorporating it into the 3GPP standard within 18 months of the agreement.[12] The Commission said it "agree[d] with commenters who assert that public safety would be best served through the delivery of a dispatchable address."[13] NASNA also agrees, and is pleased with the Roadmap signatories' commitment to achieving the dispatchable location/address objective on a shortened timeframe. NASNA would ask the Commission to codify this commitment in its rules.

b) This section of the Roadmap introduces the National Emergency Address Database (NEAD) concept, notes that some dispatchable location solutions will rely on the NEAD while others can be implemented independent of it. The carriers promised to "take steps to make non-NEAD dispatchable location information available for delivery of PSAPs,"[14] but did not describe when or how those steps would be taken. It may be surmised from the discussion in the Roadmap at 2.b.i, ii and iii that this would occur within 30 days of the anniversary of the agreement, but that is not clear. NASNA recommends the Commission nail this down in its rules.

e) This section of the Roadmap addresses the NEAD and commits to implementing this specialized database within 36 months of the date of the agreement. NASNA had many questions concerning this database such as ownership and maintenance, dispatchable location/address and MAC address validation processes, etc. These and the myriad other details that must be worked out are called out in the Roadmap.

   Today's E911 methodology for validating a location involves several databases. Addresses must conform to the number range in the Master Street Address Guide (MSAG) before they are added to the Automatic Location Identification (ALI) database. NG911 also relies on databases to validate addresses, but the functions provided by the ALI and MSAG databases have been replaced by GIS databases and a new location validation function (LVF). NG911 systems, including

[9] Ibid ¶ 44
[10] Ibid ¶ 44
[11] Roadmap at 2.c
[12] Ibid at 2.d and 2.d.i
[13] *Third Further Notice* at ¶ 105
[14] Roadmap at 2.b

the new databases, are being implemented across the country today, and more will become operational in the next 36 months. Within the timeframe of this Roadmap and beyond, the environment will be a patchwork of legacy and NG911 systems. The Roadmap does not clearly state that the NEAD will be required to use available standards-based legacy MSAGs where applicable or available standards-based NG911 LVFs where applicable. The FCC must impose this requirement.

f) This section of the Roadmap addresses handset design and development and sets forth timeframes and benchmarks for incorporating into new handsets the capability to support delivery of beacon information. The Roadmap bakes 911 location accuracy into the carriers' development of commercial Location Based Services (LBS) and migration to 4G LTE. In the past, Public safety has always said it wished carriers would consider 911 as they develop new technologies and not as an afterthought. The Roadmap, at long last, accomplishes what public safety has said it wanted.

One downside is that the Roadmap extends the Commission's outside timeframe of five years by about a year. When it proposed its two-tiered timeframe of two years and five years (three and five years in the case of the z-axis), the Commission nevertheless recognized that network and handset changes would be necessary and understood that this might take more time than it proposed. Thus, the *Third Further Notice* asked how the necessary network and handset changes would impact its proposed timeline, how long it would take CMRS providers to deploy location accuracy systems capable of meeting the proposed requirements, how long providers would need in order to upgrade handsets, and how much time it would take for market penetration to reach a level that carriers could meet the proposed 67 and 80 percent reliability requirements.[15] The signatories to the agreement have provided the answer, made a commitment and agreed to have the details of that commitment codified in the Commission's rules. Only the Commission can say whether the timeframe set forth in the Roadmap is close enough to what it proposed in the *Third Further Notice* to be acceptable. NASNA thinks the timeframes in the R&D aspect of the Roadmap are not that far off from the *Third Further Notice* and that the Commission could go either way.

Another possible downside – depending upon how one looks at it – is that the Roadmap's handset and network design and development timeframes apply only to 4G networks and make improvements in location accuracy contingent upon transition to VoLTE and consumer conversion to VoLTE devices. We understand that the carriers' technology evolution plans are to migrate their 2G and 3G networks to 4G LTE and that they have already started to deploy 4G for data. We further understand that it has always been their plan to ultimately transmit voice over LTE (VoLTE). The Roadmap synchronizes improvements in 911 location accuracy with the carriers' commercial technology migration plans. Since this synchronization is something public safety has always said it wanted, from this perspective the Roadmap is good. Still, NASNA is concerned about the 2G and 3G networks and handsets that will be out there in the environment for some

[15] *Third Further Notice* at ¶ 52

years to come – and the people who rely on them. If the Commission is inclined to adopt this aspect of the Roadmap, we would ask it to include requirements that would ensure that the combined technology advances outlined in the Roadmap result in improved location accuracy across the board and within the same timeframe.

3) Location Solutions Providing Latitude/Longitude

This section of the Roadmap addresses the technologies that will be involved and the timeframe for the introduction of devices that can support these technologies.

NASNA's comments do not address whether the level of location accuracy that can be expected with the OTDOA and A-GNSS technologies will meet what the Commission proposed – we leave that to others with the requisite expertise. We note the benchmarks the Roadmap sets forth for introducing new devices with these capabilities and compare them with the Commission's timeframes[16]: 50% of new VoLTE handsets within 24 months of the agreement is sooner than the Commission's two-year benchmark; 75% of new VoLTE handsets within 36 months of the date of the agreement is between the Commission's two and five year benchmarks; 100% of new VoLTE handsets within 48 months of the agreement is less than the Commission's five-year benchmark. The Commission did not establish new handset rollout benchmarks in the *Third Further Notice*, but the Roadmap does and represents the carriers' commitment to having the FCC codify them in its rules. We urge the Commission to do just that.

4) Metrics for Assessing Performance of Location Methods

a) The Roadmap promises that carriers would collect live wireless 911 call data on a monthly basis, which would enable real-world results to be compared with test bed results. This is good and something that has not been done in the past. Please include this in your rules.

b) This paragraph commits carriers to providing quarterly reports to NENA and APCO. NASNA thinks the carriers need also to report to the FCC and to NASNA. This would be consistent with the reporting requirements that the Commission established in its Orders under 94-102, and so we would ask the Commission to include itself and NASNA along with NENA and APCO in its rules.

c) This paragraph commits the carriers to achieving location fixes on the x and y axes within the FCC's proposed 50 meters for specific percentages of wireless 911 calls within specific timeframes, and the percentages are a blend of both indoor and outdoor measurements. We note the benchmarks the Roadmap sets forth and compare them with the Commission's: 40% of all wireless calls within two years of the date of the agreement is lower than the 65% proposed in the *Third Further Notice*; 50% of all wireless calls within three years of the date of the agreement

[16] The Commission's proposed timeframes have to do with accuracy levels achieved within those timeframes and this section of the Roadmap has to do with the introduction of VoLTE handsets into the market. Some of the arguments that have been made in opposition to this aspect of the Roadmap are rather like comparing apples and oranges. Nevertheless, we will compare apples and oranges for the purpose of illustrating that flaw.

remains lower than the 65% proposed in the *Third Further Notice* for the two-year benchmark; 75% of all VoLTE wireless 911 calls within five years of the date of the agreement is in the ballpark of the 80% proposed in the *Third Further Notice* for the same five-year benchmark; 80% of all VoLTE wireless 911 calls within six years of the date of the agreement is one year later than the five years proposed in the *Third Further Notice* for achieving that level of accuracy.

We understand that it is presently impossible to distinguish indoor calls from outdoor calls. In discussions with NENA and APCO representatives, NASNA was told that the Roadmap would measure the accuracy of 911 calls made on each location platform and not on whether the call came from indoors or out. The rationale given for this approach was (1) that it would pinpoint where improvements needed to be made in order to meet the accuracy measures to which the carriers agreed and (2) any technology a carrier would use to meet the 50 meter accuracy benchmark would have to be validated in the test bed and validated with live call data. Despite the explanation, many of our members have deep concern about reducing the level of accuracy PSAPs can expect when handling 911 calls. Additionally, the blended approach would seem to remove any real accountability for indoor location accuracy as brilliant outdoor accuracy improvements could obscure less-than-stellar results for indoor accuracy.

Paragraph d contains the carriers' commitment that its location technology deployment would be consistent between the geographic areas designated for reporting and the rest of their coverage areas, so that empirical test results established in the test bed regions would reflect performance in similar indoor locations in the real world. Paragraph d is not contained in the list of sections the carriers would like codified in the Commission's rules. NASNA thinks the provisions of paragraph d are important and urges the Commission to include such a requirement in its rules.

Only the Commission can say whether the timeframes and accuracy metrics set forth in the Roadmap are close enough to what it proposed in the *Third Further Notice* to be acceptable. The Roadmap's timeframes and performance metrics, as previously noted, are intended to track with the carriers' planned deployment of 4G LTE and VoLTE. The carriers have willingly committed to these performance benchmarks and to having the FCC enforce them. Creating a regulatory framework that enables the carriers, for the first time, to synchronize improvements in 911 with their overall technology migration plans is a positive thing. Might it not be worth it in the long run to take a little more time to do it right? We leave it to the Commission to make that determination, but offer this perspective for consideration.

5) Vertical Location Information

This section contains the carriers' commitment to develop and approve standards that would enable the delivery of z-axis data to PSAPs within 18 months of the date of the agreement. The Third Further Notice sought comment on a reasonable timeframe for provision of vertical (z-axis) information and proposed three year and five year benchmarks, and an accuracy metric of 3 meters.[17]

[17] *Third Further Notice* at ¶ 63

a) Unlike the location accuracy improvement trajectory outlined in the Roadmap for x-y coordinates, here they appear to commit to a single technology: uncompensated barometric pressure data. First, not all handsets will have the capability to provide uncompensated barometric pressure data, and unless the Commission were to require handset manufacturers to build in that capability, this could be a problem. Second, the Roadmap does not address how uncompensated barometric pressure data would meet the Commission's proposed accuracy requirement of 3 meters. On the other hand, the carriers have unambiguously committed to providing a dispatchable location/address and it is NASNA's opinion that dispatchable location/address will be more useful to PSAPs and first responders than a z coordinate in a multi-story building. That does not negate the fact that the z coordinate could be *a valuable addition or supplement*, in certain circumstances, to dispatchable location/address and x-y data provided with a 911 call.

b) NASNA agrees that there needs to be study and testing to determine how useful PSAPs and first responders would actually find the z coordinate. The *Third Further Notice* indicates that CSRIC and others have made the same point. The Roadmap states that the parties would conduct such a study within 24 months of the date of the agreement. In that 24 months, the question about its utility to PSAPs and first responders might be answered, but there will have been little progress toward actually providing the z coordinate.

c) This paragraph agrees to deliver z-axis data to PSAPs within three years of the development of standards with the caveat that standards development would have to be "timely," i.e., complete within 18 months from the date of the agreement. Yet, the Roadmap makes no effort whatsoever to meet either the *Third Further Notice's* 3 meter accuracy metric or the percentage of 911 calls that must meet that metric within the proposed three and five year timeframes. In NASNA's opinion, this is too far from what the Commission proposed and is unreasonably nebulous given the facts of the record presented in the *Third Further Notice*.

There is less substance in the Roadmap's vertical location section, which concerns us. Even though NASNA believes that a dispatchable location/address will be more useful to PSAPs and first responders, we do not agree to delay progress on achieving and delivering meaningful z-axis data. If the Commission should choose to delay its proposed z-axis requirements on the basis of what is presented in the Roadmap, then we strongly urge the Commission (1) to *require* carriers to develop dispatchable location/address technologies and deliver dispatchable location/address information to PSAPs, and (2) to do so *on the same timeframe and with the same benchmarks* as it proposed for improved x-y coordinate data. Dispatchable location/address is the gold standard for indoor location, and z-axis is not a suitable substitute for it.

6) 36 Month Assessment of Dispatchable Location

This section calls for an assessment of the dispatchable location/address solution(s) to be made 36 months from the date of the agreement and describes what will be done if the "dispatchable location

solutions are not on track."[18] If the dispatchable location solutions are not on track, and if the Commission were not to accept NASNA's recommendation made in the previous paragraph, we could all find ourselves in an unhappy situation at the end of three years from the date of the agreement. If the results of the assessment are not positive, the Roadmap says that carriers would commence implementation of *either* a dispatchable location/address or a z-axis location solution on a timeframe that pushes the provision of vertical location out three to five years from the date of the assessment, which is itself three years out from the date of the agreement, and would do so only in their top cellular market areas (CMAs). The net result would be many years' delay in delivering meaningful vertical location information, especially for consumers that are not in those CMAs.

NASNA sincerely hopes the Commission will adopt rules that hold the carriers accountable for doing whatever it takes to succeed and that do not allow for the possibility that progress might not have been made in 36 months. Holding them accountable needs to include a provision in the Commission's rules for progress reporting. We don't have a specific recommendation about what that progress reporting timeline should be, but the Commission should establish a requirement for comprehensive and regular reporting and milestone checking. The Roadmap does commit the carriers to reporting on certain things, but there doesn't appear to be a comprehensive approach that pulls it all together. This can be easily remedied in the Commission's rules.

NASNA appreciates the opportunity to provide its comments on the Roadmap, and respectfully requests that the Commission take action on these matters.

Respectfully submitted,

Evelyn Bailey

Evelyn Bailey
Director

[18] Roadmap, 6.a